As shown in FIG. 3, in addition to heat sources 100, one or more production wells 104 will typically be disposed within the portion of the coal formation. Formation fluids may be produced through production well 104. Production well 104 may also include a heat source. In this manner, the formation fluids may be maintained at a selected temperature throughout production, thereby allowing more or all of the formation fluids to be produced as vapors. Therefore high temperature pumping of liquids from the production well may be reduced or substantially eliminated, which in turn decreases production costs. Providing heating at or through the production well tends to: (1) inhibit condensation and/or refluxing of production fluid when such production fluid is moving in the production well proximate to the overburden, (2) increase heat input into the formation, and/or (3) increase formation permeability at or proximate the production well.

In the Claims:

Please cancel claim 4094, 4111, and 4124 without prejudice.

Listed below are amended and new claims. A marked-up copy of the amended claims is provided in an accompanying document.

4091. (amended) A system configured to heat a hydrocarbon containing formation, comprising:

one or more heaters disposed in one or more open wellbores in the formation, wherein the one or more heaters are configured to provide heat to at least a portion of the formation during use;

wherein the system is configured to allow heat to transfer from the one or more heaters to a part of the formation during use; and

wherein the system is configured to maintain a temperature in the part of the formation in a pyrolysis temperature range.

4092. (amended) The system of claim 4091, wherein the one or more heaters comprise at least two heaters, and wherein superposition of heat from at least the two heaters pyrolyzes at least some hydrocarbons in the part of the formation.

4093. (amended) The system of claim 4091, wherein at least one of the heaters comprises an electrical heater.

4095. (amended) The system of claim 4091, wherein at least one of the heaters comprises a flameless distributed combustor.

4096. (amended) The system of claim 4091, wherein at least one of the heaters comprises a natural distributed combustor.

4097. (amended) The system of claim 4091, wherein at least one of the open wellbores comprises a diameter of at least approximately 5 cm.

4098. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation.

4099. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing comprises steel.

4100. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing is disposed in cement.

4101. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden

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of the formation, and wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores.

4102. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores, and wherein the packing material is configured to substantially inhibit a flow of fluid between at least one of the open wellbores and the overburden casing during use.

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4103. (amended) The system of claim 4091, further comprising an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores, and wherein the packing material comprises cement.

4104. (amended) The system of claim 4091, wherein the system is further configured to transfer heat such that the transferred heat can pyrolyze at least some hydrocarbons in the part.

4105. (amended) The system of claim 4091, further comprising a valve coupled to at least one of the heaters configured to control pressure in at least a majority of the part of the formation.

4106. (amended) The system of claim 4091, further comprising a valve coupled to a production well configured to control a pressure in at least a majority of the part of the formation.

4107. (amended) A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters to at least one portion of the formation, wherein the one or more heaters are disposed in one or more open wellbores in the formation;

allowing the heat to transfer from the one or more heaters to a part of the formation;

maintaining a temperature in the part of the formation in a pyrolysis temperature range; and

producing a mixture from the formation.

4108. (amended) The method of claim 4107, wherein the one or more heaters comprise at least two heaters, and wherein superposition of heat from at least the two heaters pyrolyzes at least some hydrocarbons in the part of the formation.

4109. (amended) The method of claim 4107, further comprising maintaining a temperature in the part in a pyrolysis temperature range with a lower pyrolysis temperature of about 250 ºC and an upper pyrolysis temperature of about 400 ºC.

4110. (amended) The method of claim 4107, wherein at least one of the heaters comprises an electrical heater.

4112. (amended) The method of claim 4107, wherein at least one of the heaters comprises a flameless distributed combustor.

4113. (amended) The method of claim 4107, wherein at least one of the heaters comprises a natural distributed combustor.

4114. (amended) The method of claim 4107, wherein the one or more heaters are suspended in the one or more open wellbores.

4115. (amended) The method of claim 4107, wherein a tube is disposed in at least one of the open wellbores proximate to one of the heaters, and comprising flowing a substantially constant amount of fluid in at least one of the open wellbores through critical flow orifices in the tube.

4116. (amended) The method of claim 4107, wherein a perforated tube is disposed in at least one of the open wellbores proximate to the heater, and comprising flowing a corrosion inhibiting fluid in at least one of the open wellbores through the perforated tube.

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4117. (amended) The method of claim 4107, further comprising coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation.

4118. (amended) The method of claim 4107, further comprising coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing comprises steel.

4119. (amended) The method of claim 4107, further comprising coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing is further disposed in cement.

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4120. (amended) The method of claim 4107, further comprising coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores.

4121. (amended) The method of claim 4107, further comprising coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the method further comprises inhibiting a flow of fluid between at least one of the open wellbores and the overburden casing with a packing material.

4122. (amended) The method of claim 4107, further comprising heating at least the portion of the formation to substantially pyrolyze at least some hydrocarbons in the formation.

4123. (amended) The method of claim 4107, further comprising controlling a pressure and a temperature in at least a majority of the part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

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4125. (amended) The method of claim 4107, further comprising controlling a pressure in at least a majority of the part of the formation with a valve coupled to at least one of the heaters.

4126. (amended) The method of claim 4107, further comprising controlling a pressure in at least a majority of the part of the formation with a valve coupled to a production well located in the formation.

4127. (amended) The method of claim 4107, further comprising controlling the heat such that an average heating rate of the part is less than about 1 ºC per day during pyrolysis.

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4128. (amended) The method of claim 4107, wherein providing heat from the one or more heaters to at least the portion of the formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons in the selected volume of the formation; and

wherein heating energy/day *(Pwr)* provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate of the formation (h) is about 10 °C/day.

4129. (amended) The method of claim 4107, wherein allowing the heat to transfer from the one or more heaters to the part comprises transferring heat substantially by conduction.

4130. (amended) The method of claim 4107, wherein providing heat from the one or more heaters increases a thermal conductivity of at least a portion of the part to greater than about 0.5 W/(m ºC).

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4143. (amended) The method of claim 4107, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises molecular hydrogen, wherein the molecular hydrogen is greater than about 10 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure, and wherein the

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molecular hydrogen is less than about 80 % by volume of the non-condensable component at 25 °C and one atmosphere absolute pressure.

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4146. (amended) The method of claim 4107, further comprising controlling a pressure in at least a majority of the part of the formation.

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4147. (amended) The method of claim 4107, further comprising controlling a pressure in at least a majority of the part of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

4148. (amended) The method of claim 4107, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bar.

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4150. (amended) The method of claim 4107, further comprising recirculating a portion of hydrogen from the mixture into the formation.

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4151. (amended) The method of claim 4107, further comprising altering a pressure in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

4152. (amended) The method of claim 4107, further comprising:

providing hydrogen (H_2) to the heated part of the formation to hydrogenate hydrocarbons in the part; and

heating a portion of the part with heat from hydrogenation.

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4154. (amended) The method of claim 4107, wherein allowing the heat to transfer increases a permeability of a majority of the part to greater than about 100 millidarcy.

4155. (amended) The method of claim 4107, wherein allowing the heat to transfer increases a

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permeability of a majority of the part of the formation such that the permeability of the majority of the part is substantially uniform.

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4157. (amended) The method of claim 4107, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heaters are disposed in the formation for the production well.

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4158. (amended) The method of claim 4107, further comprising providing heat from heaters to at least a portion of the formation, wherein the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

4159. (amended) The method of claim 4107, further comprising providing heat from heaters to at least a portion of the formation, wherein the heaters are located in the formation in a unit of heaters, wherein the unit of heaters comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

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4165. (amended) The method of claim 4107, wherein the mixture is produced from a production well, the method further comprising heating a wellbore of the production well to inhibit condensation of the mixture in the wellbore.

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4167. (amended) The method of claim 4107, wherein the part is heated to a minimum pyrolysis temperature of about 270 °C.

4168. (amended) The method of claim 4107, further comprising maintaining the pressure in the formation above about 2.0 bar absolute to inhibit production of fluids having carbon numbers above 25.

4169. (amended) The method of claim 4107, further comprising controlling pressure in the formation in a range from about atmospheric pressure to about 100 bar, as measured at a wellhead of a production well, to control an amount of condensable hydrocarbons in the

produced mixture, wherein the pressure is reduced to increase production of condensable hydrocarbons, and wherein the pressure is increased to increase production of non-condensable hydrocarbons.

4170. (amended) The method of claim 4107, further comprising controlling pressure in the formation in a range from about atmospheric pressure to about 100 bar, as measured at a wellhead of a production well, to control an API gravity of condensable hydrocarbons in the produced mixture, wherein the pressure is reduced to decrease the API gravity, and wherein the pressure is increased to reduce the API gravity.

5396. (amended) The method of claim 4157, wherein at least about 20 heaters are disposed in the formation for each production well.

5397. (new) The system of claim 4091, wherein the pyrolysis temperature range is from about 250 °C to about 400 °C.

5398. (new) The method of claim 4107, further comprising providing H_2 to at least a portion of the formation.

5399. (new) The method of claim 4107, further comprising providing H_2 to at least a portion of the formation to hydrogenate at least some hydrocarbons in at least the portion of the formation.

5400. (new) A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters to at least one portion of the formation, wherein the one or more heaters are disposed in one or more open wellbores in the formation, and wherein one or more heaters provide a heat output of less than about 1650 watts per meter;

allowing the heat to transfer from the one or more heaters to a pyrolysis zone of the formation;

maintaining a temperature in the part of the formation in a pyrolysis temperature range;

and

producing a mixture from the formation.

5401. (new) The method of claim 5400, wherein the pyrolysis zone comprises a selected section.

5402. (new) The method of claim 5400, wherein at least one heater comprises a natural distributed combustor.

5403. (new) The method of claim 5400, further comprising producing a mixture from the pyrolysis zone, wherein the mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

5404. (new) The method of claim 5400, further comprising controlling a pressure and a temperature in at least a majority of the pyrolysis zone, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

5405. (new) The method of claim 5400, further comprising providing H_2 to at least a portion of the formation.

5406. (new) The method of claim 5400, further comprising providing H_2 to at least a portion of the formation to hydrogenate at least some hydrocarbons in at least the portion of the formation.

5407. (new) The method of claim 5400, wherein the pyrolysis temperature range is from about 250 °C to about 400 °C.

5408. (new) The method of claim 5400, wherein providing heat from the heaters to the portion of the formation comprises:

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heating a selected volume (V) of the formation from one or more of the heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day (Pwr) provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

Response To Office Action Mailed January 23, 2003

A. Pending Claims

Claims 4091-4093, 4095-4110, 4112-4123, 4125-4170, and 5396-5408 are pending in the case. Claims 4091-4093, 4095-4110, 4112-4123, 4125-4130, 4143, 4146-4148, 4150-4152, 4154, 4155, 4157-4159, 4165, 4167-4170 have been amended. Claims 4092, 4093, 4095-4106, 4108-4110, 4112-4123, 4125-4130, 4143, 4146-4148, 4150-4152, 4154, 4155, 4157-4159, 4165, 4167-4170 have been amended for clarification and/or correction of typographical errors. Claims 5397-5408 are new. Claim 4094, 4111, and 4124 have been cancelled.

B. Information Disclosure Statements

Applicant has not received a signed, initialed copy of page 6 of 9 of Form PTO-1449 (references A149-A178) mailed with the Information Disclosure Statement submitted on December 17, 2001 (return receipt postcard date stamp received at the USPTO on January 3, 2002). Applicant has enclosed a copy of page 6 of the originally submitted Form PTO-1449. Applicant respectfully requests a signed, initialed copy of the above-mentioned page.

C. Submission of Corrected Formal Drawings

In the Office Action mailed January 23, 2003, the Examiner indicated approval of the proposed drawing corrections. Applicant submits the corrected formal drawings approved by the Examiner (nine sheets, including FIGS. 23a, 23b, 32, 56, 57, 67, 68, 72, 73, 76, 81a, and 97).

D. Provisional Double Patenting Rejection

The Examiner provisionally rejected claims 4091-4170 and 5396 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending U.S. Patent Application Nos.:

09/840,936; 09/840,937, 09/841,000; 09/841,060; 09/841,061; 09/841,127; 09/841,128; 09/841,129; 09/841,130; 09/841,131; 09/841,170; 09/841,193; 09/841,194; 09/841,195; 09/841,238; 09/841,239; 09/841,240; 09/841,283; 09/841,284; 09/841,285; 09/841,286; 09/841,287; 09/841,288; 09/841,289; 09/841,290; 09/841,291; 09/841,292; 09/841,293; 09/841,294; 09/841,295; 09/841,296; 09/841,297; 09/841,298; 09/841,299; 09/841,300; 09/841,301; 09/841,303; 09/841,304; 09/841,305; 09/841,306; 09/841,307; 09/841,308; 09/841,309; 09/841,310; 09/841,311; 09/841,312; 09/841,429; 09/841,430; 09/841,431; 09/841,432; 09/841,433; 09/841,434; 09/841,435; 09/841,436; 09/841,437; 09/841,438; 09/841,439; 09/841,440; 09/841,441; 09/841,442; 09/841,443; 09/841,444; 09/841,445; 09/841,447; 09/841,448; 09/841,449; 09/841,488; 09/841,489; 09/841,490; 09/841,491; 09/841,492; 09/841,493; 09/841,494; 09/841,495; 09/841,496; 09/841,497; 09/841,498; 09/841,499; 09/841,500; 09/841,501; 09/841,502; 09/841,632; 09/841,633; 09/841,634; 09/841,635; 09/841,636; 09/841,637; 09/841,638; and 09/841,639.

Applicant respectfully traverses the provisional double patenting rejection. Applicant respectfully submits that the omnibus nature of this rejection does not provide Applicant with sufficient detail in which to address such rejection. Applicant also respectfully submits that the rejection is inconsistent with certain restrictions issued in the above-referenced cases. Applicant does not believe that the Examiner has shown that each of the ninety applications contains at least one claim the conflicts with another one of the related co-pending applications. Applicant respectfully requests reconsideration.

Pursuant to a discussion in an Examiner interview on August 19, 2002, for the convenience of the Examiner, Applicant will forward copies of allowed claims for the above-referenced cases to the Examiner's Supervisor. Applicant understands that the Examiner's Supervisor will review the allowed claims for the above-referenced cases and then reconsider the double patenting rejection in view of such allowed claims.

E. The Claims Are Not Indefinite Pursuant To 35 U.S.C. § 112, Second Paragraph

Claims 4109, 4150, and 4166 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully disagrees that the claims are indefinite.

The Examiner states: "Claims 4109 and 4150 recite the limitation 'wherein controlling conditions comprises'. There is insufficient antecedent basis for the step of controlling in the claims." Applicant has amended claims 4109 and 4150 for clarification. Applicant respectfully requests removal of the rejections of claims 4109 and 4150.

The Examiner states: "Claim 4166 is unclear regarding the 'heater element'. It is unclear whether this is different from the previously claimed 'heat source'." Applicant submits that the heater element is different from the previously claimed heat source. Applicant respectfully requests removal of the rejection of claim 4166.

F. The Claims Are Not Anticipated By Camacho Pursuant To 35 U.S.C. § 102(b)

The Examiner rejected claims 4091, 4093, 4098, 4100-4102, 4104, 4107, 4110, 4114, 4115, 4117, 4119, 4121, 4122, 4129, 4154, 4155, and 4167 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 4,067,390 to Camacho et al. (hereinafter "Camacho"). Applicant respectfully disagrees that the claims are anticipated by Camacho.

The standard for "anticipation" is one of fairly strict identity. To anticipate a claim of a patent, a single prior source must contain all the claimed essential elements. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 U.S.P.Q.81, 91 (Fed.Cir. 1986); *In re Donahue*, 766 F.2d 531, 226 U.S.P.Q. 619, 621 (Fed.Cir. 1985).

The Examiner states: "Camacho shows a system configured to heat a coal formation comprising a heat source in an open wellbore as called for in claim 4091." The Examiner also states: "Camacho teaches a method of treating a coal formation including the steps of providing heat from one or more heat sources disposed within open wellbores in the formation (figure 2) allowing heat to transfer, and producing a mixture (abstract line 2) as called for in claim 4107."

Camacho states:

> Localized temperatures along the centerline of the plasma arc may reach as high as 7000° C. Torch cooling water is introduced and removed through cable 26. As described in detail below, once a volume of coal immediately surrounding the torch has been heated to approximately 1000° C, the steam is introduced into the shaft 20 through line 30. (Camacho, col. 7, lines 41-47)

Camacho further states:

> [T]he torch is initially operated at low power to gradually bring the coal near the torch to a temperature of approximately 1000° C to 1300° C. Once a heat front has advanced to preheat and devolatilize a spherical devolitilization [*sic*] zone 40 around the torch (see FIG. 4), steam may be introduced to begin gasifying the coal. As soon as the steam is introduced, the power to the torch should be increased so as to supply the endothermic heat requirements for the water-shift gasification reactions while maintaining the temperature of the coal at or near 1000° C. As the shaft erodes away during gasification, the energy to the torch should be gradually increased since the surface area being exposed to the heat and the gasification rate are constantly increasing. (Camacho, col. 10, lines 43-57)

Camacho appears to teach raising a temperature of a face of the formation to a temperature above a pyrolysis temperature range.

Amended claim 4091 describes a combination of features including: "wherein the system is configured to maintain a temperature in the part of the formation in a pyrolysis temperature range." Amended claim 4107 describes a combination of features including: "maintaining a temperature in the part of the formation in a pyrolysis temperature range." Applicant's Specification states: "a pyrolysis temperature range may include temperatures between about 250 °C and about 900 °C. In an alternative embodiment, a pyrolysis temperature range may include temperatures between about 270 °C and about 400 °C." (Specification, page 46, lines 13-15). At least the above-quoted features of claims 4091 and 4107, in combination with other features of the claims, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejections of claims 4091 and 4107 and claims dependent thereon.

The Examiner states: "Camacho also shows the overburden casing disposed in cement (21) as called for in claim 4100 [4119]." Camacho discloses: "As seen in FIG. 2, the upper end of shaft 20 is capped by a concrete well cap 21 having openings therein for introducing steam injection line 30, the flexible cable 26, and a product gas removal line 23. (Camacho, col. 7, lines 28-31) Camacho appears to teach a concrete well cap 21. Camacho does not appear to teach or suggest an overburden casing disposed in concrete.

Amended claim 4100 describes a combination of features including: "an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing is further disposed in cement." Amended claim 4119 describes a combination of features including: "coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the overburden casing is further disposed in cement." At least the above-quoted features of claims 4100 and 4119, in combination with other features of the claims, do not appear to be taught or suggested by the cited art.

The Examiner states: "Camacho also shows the overburden casing and packing material

(cement- 21) as called for in claim 4101 [4120]." The Examiner also states: "Camacho also show the overburden casing and packing material (cement- 21) configured to inhibit fluid flow as called for in claim 4102 [4121]." Camacho appears to teach a concrete well cap 21 positioned at the surface of the wellbore. Camacho does not appear to teach packing material disposed at a junction of the overburden casing and an open wellbore.

Amended claims 4101 and 4102 describe a combination of features including: "an overburden casing coupled to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores". Amended claim 4120 describes a combination of features including: "coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein a packing material is disposed at a junction of the overburden casing and at least one of the open wellbores." Claim 4121 describes a combination of features including: "coupling an overburden casing to at least one of the open wellbores, wherein the overburden casing is disposed in an overburden of the formation, and wherein the method further comprises inhibiting a flow of fluid between at least one of the open wellbores and the overburden casing with a packing material." At least the above-quoted features of claims 4101, 4102, 4120, and 4121, in combination with other features of the claim, do not appear to be taught or suggested by the cited art.

The Examiner states: "Camacho also shows the tube (18) and the providing a substantially flow of fluid (steam) through critical flow orifices (shown in fig 2 near 25) as called for in claim 4115." Camacho states: "A permeable lining 18, through which gases can feely pass, is placed from the top of the coal seams to the initial torch location; this permeable lining 18 is constructed of materials such that it will be consumed when directly exposed to the plasma torch energy." (Camacho, col. 6, lines 31-36) Camacho appears to teach a wellbore with a permeable lining. Camacho does not appear to teach or suggest critical flow orifices.

Amended claim 4115 recites, in part: "further comprising flowing a substantially constant

amount of fluid into at least one of the open wellbores through critical flow orifices in the tube". At least the above-quoted feature of claim 4115, in combination with other features of the claim, does not appear to be taught or suggested by the cited art.

The Examiner states: "With regards to claims 4154 and 4155; the Camacho reference does not explicitly teach the increasing permeability; however this is inherent in a process of heating coal." Applicant respectfully disagrees that increasing the permeability is inherent. Camacho appears to teach or suggest rapidly heating the formation. Heating at a high rate as taught by Camacho is likely to remove the material of the formation (which will not increase the permeability of the remaining formation) and/or slag the face being heated.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Amended claim 4154 describes a combination of features including: "wherein allowing the heat to transfer increases a permeability of a majority of the part to greater than about 100 millidarcy." Amended claim 4155 describes a combination of features including: "wherein allowing the heat to transfer increases a permeability of a majority of the part such that the permeability of the majority of the part is substantially uniform." At least the above-quoted features of claim 4154 and 4155, in combination with other features of the claims, do not appear to be taught or suggested by the cited art. Applicant respectfully requests that the Examiner provide support that the above-quoted features are inherent to Camacho. Otherwise, Applicant requests that the rejections of claims 4154 and 4155 be removed.

G. The Claims Are Not Anticipated By Terry Pursuant To 35 U.S.C. § 102(b)

The Examiner rejected claims 4091, 4092, 4096, 4103, 4107, 4108, 4113, 4120, 4124, 4146, 4150, 4152, 4156-4164, 4166, and 5396 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 4,093,025 to Terry (hereinafter "Terry"). Applicant respectfully disagrees that the claims are anticipated by Terry.

The Examiner states: "Terry teaches a system configured to heat a coal formation comprising one or more heat sources (10) disposed within one or more open wellbores (see figure 4), wherein the system is configured to allow heat to transfer as called for in claim 4091." The Examiner also states: "Terry teaches the method of treating a coal formation comprising providing heat from one or more heat sources, wherein the heat sources are disposed in open wellbores, allowing heat to transfer and producing a mixture as called for in claim 4107."

Applicant's Specification discloses: "A 'heater' is generally defined as any system configured to generate heat in a well or a near wellbore region. (Specification, page 40, lines 6-7) Terry states: "Wells to be ignited are pumped free of water, ignition material, such as hot ceramic balls 10, are positioned in the coal strata, and oxygen is injected into the coal formation through an injection conduit 12 as the formation is set on fire." Applicant submits that the ceramic balls of Terry are not heaters as described by Applicant.

Amended claim 4091 describes a combination of features including: "one or more heaters disposed in one or more open wellbores in the formation" and "wherein the system is configured to maintain a temperature in the part of the formation in a pyrolysis temperature range". Amended claim 4107 describes a combination of features including: "providing heat from one or more heaters to at least one portion of the formation" and "maintaining a temperature in the part of the formation in a pyrolysis temperature range". Terry does not appear to teach or suggest maintaining the temperature in a pyrolysis temperature range. At least the above-quoted features of claims 4091 and 4107, in combination with other features of the claims, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of

claims 4091 and 4107 and claims dependent thereon. Applicant submits that many of the claims dependent on claims 4091 and 4107 are separately patentable.

The Examiner states: "Terry also shows at least two heat sources as called for in 4092, the superposition is inherent." The Examiner also states: "Terry also shows at least two heat sources and teaches the pyrolyzation as called for in claim 4108, the superposition is inherent."

Applicant submits that the ceramic balls of Terry do not "generate heat" as described in Applicant's Specification (noted above). Applicant further submits that the ceramic balls of Terry function as a single heat source rather than individual heat sources. Amended claims 4092 and 4108 describe a combination of features including: "wherein the one or more heaters comprise at least two heaters". Applicant respectfully requests removal of the rejection of claims 4092 and 4108.

The Examiner states: "With regards to claim 4156; the yield of greater than 60% is inherent." Claim 4156 describes a combination of features including: "controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay." The product recited in claim 4156 may be produced by controlling and/or modifying formation conditions during treatment to produce the selected result recited in the claim. Applicant submits that the product recited in claim 4156 would not be producible by carrying out the heating process of Terry. Applicant submits that the above-mentioned feature of claim 4156 is not inherent to Terry. In relying up on the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). Applicant respectfully requests that the Examiner provide support that the above-quoted features are inherent to Terry. Otherwise, Applicant requests that the rejection of claim 4156 be removed.

The Examiner states: "Terry also shows at least about 7 heat sources as called for in claim 4157. Terry also shows at least about 3 heat sources in a triangular pattern as called for in

claim 4158. Terry also shows at least about 3 heat sources in a triangular pattern as called for in claim 4159." The Examiner also states: "Terry also shows the at least 20 heat sources as called for in claim 5396." Terry refers to hot ceramic balls (10) as an example of ignition material. (Terry, col.7, lines 62-63)

Amended claim 4157 describes a combination of features including: "wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heaters are disposed in the formation for the production well." Amended claim 4158 describes a combination of features including: "providing heat from heaters to at least a portion of the formation, wherein the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern." Amended claim 4159 describes a combination of features including: "providing heat from heaters to at least a portion of the formation, wherein the heaters are located in the formation in a unit of heaters, wherein the unit of heaters comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units." Amended claim 5396 describes a combination of features including: "wherein at least about 20 heaters are disposed in the formation for each production well."

Applicant submits that the collection of hot ceramic balls shown in FIG. 4 of Terry functions as a single heat source. Applicant respectfully disagrees that individual ceramic balls (10) are equivalent to heaters described in claims 4157-4159 and 5396. Terry does not appear to teach or suggest the features relating to heaters in amended claims 4157-4159 and 5396. Applicant respectfully requests removal of the rejection of claims 4157-4159 and 5396.

The Examiner states: "Terry also shows the liquid and gas stream, and the aqueous and non-aqueous streams as called for in claim 4161." Claim 4161 describes a combination of features including: "separating the produced mixture into a gas stream and a liquid stream and separating the liquid stream into an aqueous stream and a non-aqueous stream." Terry does not appear to teach or suggest separating the liquid stream into an aqueous stream and a non-aqueous stream. At least the above-quoted features of claim 4161, in combination with other features of

the claim, do not appear to be taught or suggested by the cited art.

H. The Claims Are Not Obvious Over Terry Pursuant To 35 U.S.C. § 103(a)

The Examiner rejected claims 4097, 4099, 4118, 4130-4145, 4147-4149, and 4153 under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 4,093,025 to Terry. Applicant respectfully disagrees that the claims are obvious over Terry.

In order to reject a claim as obvious, the Examiner has the burden of establishing a *prima facie* case of obviousness. *In re Warner et al.*, 379 F.2d 1011, 154 U.S.P.Q. 173, 177-178 (C.C.P.A. 1967). To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP § 2143.03.

The Examiner states, "Terry teaches all of the limitations of claims 4091 and 4107, from which these claims depend." For at least the reasons cited in Section G above, applicant believes that the cited art does not teach or suggest the features of claims 4091 and 4107. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Applicant respectfully requests removal of the rejections of claims 4097, 4099, 4118, 4130-4145, 4147-4149, and 4153. Applicant submits, in addition, that many of the claims dependent on claims 4091 and 4107 are separately patentable.

The Examiner states: "With regards to claim 4130; most coals have a thermal conductivity of less than 5.0 W/m°C; thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have practiced the Terry invention in a coal with a thermal conductivity of less than 5.0 W/m°C, as called for in claim 4130."

Applicant submits that amended claim 4130 does not recite "a thermal conductivity of less than 5.0 W/m°C" as stated by the Examiner. Applicant submits that features of amended

claim 4130, including: "wherein providing heat from the one or more heaters increases a thermal conductivity of at least a portion of the part to greater than about 0.5 W/(m °C)" are unexpected based on literature in the art. At least the above-quoted feature of claim 4130, in combination with other features of the claim, does not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4130.

The Examiner states:

> With regards to claims 4131-4144, 4148, and 4149; the nature of hydrocarbons produced from such heating is highly variable, and dependent upon many factors, not least of which is the characteristics of the coal. The components of the produced mixture are deemed to be the results of design variables, including coal characteristics and temperature.

Applicant submits that the product mixtures recited in claims 4131-4144, 4148, and 4149 would not be producible by carrying out the heating process of Terry. The process conditions dictated in Terry would not appear to teach or suggest the ability to produce product mixtures as claimed in claims 4131-4144, 4148, and 4149. The Examiner appears to be unjustifiably extending the teaching of Terry. Applicant requests the removal of the rejections of claims 4131-4144, 4148, and 4149.

The Examiner states: "With regards to claim 4145; Terry teaches ammonia, but fails to teach the fertilizer. It is well known to make fertilizer from ammonia; because it has a high nitrogen content; it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have included a production of fertilizer, as called for in claim 4145."

Terry discloses:

> Exit gases from production well 201, FIG. 1, in coal block 7 are delivered to a conventional gas clean-up Plant 103, FIG. 1, where the components of the gas are segregated by conventional means of scrubbing, absorption, adsorption,

> condensation, and the like. From plant 103, water vapor is condensed and sent to the water Plant 104, hydrogen is sent to a conventional ammonia Plant 106 and to a conventional methane converter Plant 107. (Terry, col. 8, lines 15-23)

Terry appears to teach producing ammonia in an above surface facility using hydrogen produced from the formation. Terry does not appear to teach or suggest producing a mixture comprising ammonia. Terry does not appear to teach or suggest producing a mixture comprising ammonia and using the ammonia to produce fertilizer.

Claim 4145 describes a combination of features including: "wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer." Terry does not appear to teach or suggest producing a mixture comprising ammonia. Terry does not appear to teach or suggest producing a mixture comprising ammonia and using the ammonia to produce fertilizer. At least the above-quoted features of claim 4145, in combination with other features of the claim, do not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4145.

I. The Claims Are Not Anticipated By Or Obvious Over Tsai Pursuant To 35 U.S.C. § 102(b) or 103(a) Respectively

The Examiner rejected claims 4091 and 4107 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 4,067,390 to Tsai et al. (hereinafter "Tsai"). Applicant respectfully disagrees with these rejections.

The Examiner states: "Tsai shows a system configured to heat a coal formation comprising a heat source in an open wellbore as called for in claim 4091." The Examiner also states: "Tsai teaches a method of treating a coal formation including the steps of providing heat from one or more heat sources disposed within open wellbores in the formation allowing heat to transfer, and producing a mixture as called for in claim 4107."

Amended claims 4091 describes a combination of features including: "one or more

heaters disposed in one or more open wellbores in the formation, wherein the one or more heaters are configured to provide heat to at least a portion of the formation during use". Amended claim 4107 describes a combination of features including: "providing heat from one or more heaters to at least one portion of the formation, wherein the one or more heaters are disposed in one or more open wellbores in the formation."

Tsai discloses: "the oxidizing gas is injected into the injection hole at an appropriate rate and the fire is started in the coal bed at the injection well" (Tsai, col.2, lines 30-33). Applicant respectfully submits that Tsai does not appear to teach or suggest providing heat from one or more heaters as defined by the Applicant's Specification. Applicant does not believe that Tsai teaches or suggests at least the above-quoted features of claims 4091 and 4107, in combination with the other features of the claims. Applicant respectfully requests removal of the rejections of claims 4091 and 4107.

J. The Claims Are Not Obvious Over Terry In View Of Kasevich et al. Pursuant To 35 U.S.C. § 103(a)

The Examiner rejected claims 4127 and 4128 under 35 U.S.C. § 103(a) as being unpatentable over Terry in view of U.S. Patent No. 4,457,365 to Kasevich et al. (hereinafter "Kasevich"). Applicant respectfully disagrees with these rejections.

Kasevich states: "this invention provides for heating kerogen in oil shale with electric fields having frequency components in the range between 100 kilohertz and 100 megahertz where dry oil shale is selectively heated, with kerogen-rich regions absorbing energy from said fields at substantially higher rates than kerogen-lean regions" (Kasevich, col. 2, lines 9-15).

Terry discloses: "Wells to be ignited are pumped free of water, ignition material, such as hot ceramic balls 10, are positioned in the coal strata, and oxygen is injected into the coal formation through an injection conduit 12 as the formation is set on fire." (Terry, col. 7, lines 61-65). Terry appears to teach or suggest heating the formation quickly substantially by the use

of forced burning of a portion of the formation.

Obviousness can only be established by "showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teaching of the references." *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Applicant respectfully submits that the features of the electric field heating method of Kasevich for an oil shale formation would not be suitable for modifying the in situ combustion process of Terry for a coal formation to produce the features described in claims 4127 and 4128.

The Examiner states: "With regards to claim 4127; it is noted that Kasevich teaches an average of approximately 1.6 °/day. It is apparent that when the temperature reaches its highest point (the point at which pyrolysis occurs) the rate of increase would be at the slowest; thus it would be less than about 1 °C/day. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have included heating at less than about 1 °C/day during pyrolysis as called for in claim 4127; in order to achieve more uniform heating."

Kasevich states: "Thus, if the kerogen were heated from 150 °C. to 500 °C. at the rate of 50 °C./month, the absorption rate would approximate that of curve 114 [in Figure 3], while more rapid heating rates would produce curves 120, 122 and 124 for heating rates of 50 °C. per month, 50 °C./day, 50 °C./hour and 50 °C./minute, respectively." (Kasevich, col. 8, lines 57-62) Kasevich shows in figure 3 a heating rate of 50 °C/month, which may correspond to an average heating rate of about 1.6 °C/day. Kasevich does not appear to teach or suggest a heating rate of less than 1 °C/day during pyrolysis. The Examiner states, however: "It is apparent that when the temperature reaches its highest point (the point at which pyrolysis occurs) the rate of increase would be at the slowest; thus it would be less than about 1 °C/day." Applicant respectfully submits that the Examiner appears to be using personal knowledge to extend the teaching of Kasevich. At least the feature of claim 4127 of "controlling the heat such that an average heating

rate of the part is less than about 1 ºC per day during pyrolysis", in combination with other features of the claim, does not appear to be taught or suggested by the cited art. Applicant respectfully requests removal of the rejection of claim 4127.

The Examiner states: "With regards to claim 4128; it is known to heat at rates of less than 10°C per day, as shown by Kasevich (figure 3).... It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have included heating at a rate of less than about 10°C per day as called for in claim 4128, in order to achieve more uniform heating. The claim limitations drawn to the heating energy are nothing more than well known thermodynamic equations."

Kasevich states:

> The process and apparatus for extracting the products of kerogen in situ from an oil shale body by supplying energy selectively to the kerogen by high frequency electric fields in the frequency range between 100 kilohertz and 1000 megahertz at an intensity which heats the kerogen to a temperature range between 250° C. and 500° C. to allow pyrolysis of the kerogen prior to substantial heat transfer to the surrounding mineral portions of the oil shale. A plurality of groups of spaced radiators produce the electric fields for heating the kerogen. A dipole radiator in the subsurface formation is supplied with electromagnetic energy through a transmission line from an energy generator on the surface. (Kasevich, abstract)

Kasevich further states:

> In dry oil shale, the conductivity continues to be reduced, as shown by the curve portions 108, reaching a minimum approaching, for example, 10^{-4} mhos per meter at a temperature around 250° C. as shown by curve 112. In this region the major portion of the power is absorbed by the kerogen as shown by curve 118, which assumes sufficiently rapid rise in temperature that no pyrolysis has yet taken place and the conductivity of the inorganic or mineral portion of the oil shale approaches 10^{-5} mhos per meter as shown by curve 116.
>
> As shown by the portions of the formation conductivity curves 114, 120, 122, and 124, different radiation rates produce different energy absorption increases with temperature above 250° C. due partly to conversion of the

> kerogen to higher conductivity products. (Kasevich, col. 7, line 66 - col. 8, line 13)

Kasevich appears to teach or suggest heating a formation by providing energy in the form of electric fields. The rate of heating appears to be determined by the different inherent conductivities of kerogen and kerogen products. Kasevich and Terry do not appear to teach or suggest using a desired average heating rate to calculate an average heating energy/day to be applied to a selected volume of a formation.

Amended claim 4128 describes a combination of features including: "heating a selected volume (V) of the hydrocarbon containing formation from the one or more heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and wherein heating energy/day *(Pwr)* provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate of the formation (h) is about 10 °C/day." At least the quoted features of claim 4128, in combination with other features of the claims, do not appear to be taught or suggested by the cited art.

K. The Claims Are Not Obvious Over Gregoli Pursuant To 35 U.S.C. § 103(a)

The Examiner rejected claims 4151, 4168, 4169, and 4170 under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,016,867 to Gregoli et al. (hereinafter "Gregoli"). Applicant respectfully disagrees that claims 4151, 4168, 4169, and 4170 are obvious over Gregoli.

The Examiner states:

> It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have included altering pressure to inhibit production of hydrocarbons having carbon numbers greater than about 25, as called for in claim 4151, in order to improve production.
>
> With regards to claim 4168; it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have controlled the pressure to be greater than about 2.0 bar to

inhibit production of hydrocarbons having carbon numbers greater than about 25, as called for in claim 4168, in order to improve production.

With regards to claims 4169-4170; Gregoli teaches the increasing pressure to inhibit production of heavy hydrocarbons; thus also implicitly teaching decreasing pressure to increase heavy hydrocarbons. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Terry method to have included controlling pressure to control production of condensable hydrocarbons as called for in claim 4169 or to control the API gravity of hydrocarbons as called for in claim 4170.

Gregoli states:

> A process is disclosed for the in situ conversion and recovery of heavy crude oils and natural bitumens from subsurface formations using either a continuous operation with one or more injection and production boreholes, which may include horizontal boreholes, or a cyclic operation whereby both injection and production occur in the same boreholes. A mixture of reducing gases, oxidizing gases, and steam are fed to downhole combustion devices located in the injection boreholes. Combustion of the reducing gas-oxidizing gas mixture is carried out to produce superheated steam and hot reducing gases for injection into the formation to convert and upgrade the heavy crude or bitumen into lighter hydrocarbons. (Gregoli, abstract)

Gregoli appears to teach or suggest injecting reducing gases, oxidizing gases, and steam into injection boreholes in a heavy hydrocarbon or tar sands formation. Combustion of the gas mixture produces super-heated steam, which heats the formation. The heat converts and upgrades hydrocarbons in the formation. Terry appears to teach heating a coal seam by in situ combustion of the coal.

Claims 4151, 4168, 4169, and 4170 describe combinations of features including controlling products and/or product mixtures produced by controlling a pressure associated with at least a portion of the formation. Applicant does not believe that the combination of Gregoli and Terry teaches or suggests at least the feature of claims 4151, 4168, 4169, and 4170, in combination with the other features of the claims. Applicant submits that features such as controlling and/or altering the pressure as recited in claims 4151, 4168, 4169, and 4170 provides unexpected and/or improved results based on the prior art, as noted in Applicant's Specification

(page 130, line 16-page 131, line 18). Applicant respectfully requests removal of the rejections of claims 4151, 4168, 4169, and 4170.

L. Claim 4109 Is Not Obvious Over Camacho In View of Tsai Pursuant To 35 U.S.C. § 103(a)

The Examiner rejected claim 4109 under 35 U.S.C. 103(a) as obvious over Camacho in view of Tsai. Applicant respectfully disagrees that claim 4109 is obvious over Camacho in view of Tsai.

The Examiner states:

> Camacho fails to teach the maintaining temperature within a range of about 250 to 400°C.
>
> Tsai teaches a method of increasing permeability in order to prepare for in situ gasification. The Tsai method includes maintaining temperature within a range of about 250 to 400°C.

Camacho appears to teach raising a temperature of a face of the formation to a temperature above the pyrolysis temperature range using a plasma torch as previously discussed. Camacho does not appear to teach the feature of maintaining a temperature in the part of the formation in a pyrolysis temperature range. Applicant submits that Tsai appears to teach or suggest a forced burning of a coal formation.

Claim 4109 describes a combination of features including: "maintaining a temperature in the part in a pyrolysis temperature range with a lower pyrolysis temperature of about 250 ºC and an upper pyrolysis temperature of about 400 ºC." Applicant respectfully submits that the features of the plasma torch heating method of Camacho for a coal formation would not be suitable for modifying the in situ combustion process of Terry for a coal formation to produce the features described in claim 4109. Applicant therefore requests removal of the obviousness rejection of claim 4109.

M. Claim 4165 Is Not Obvious Over Terry in View of Parry Pursuant to 35 U.S.C. § 103(a)

The Examiner rejected claim 4165 under 35 U.S.C. § 103(a) as being unpatentable over Terry in view of U.S. Patent No. 48,994 to Parry (hereinafter "Parry"). Applicant respectfully disagrees with this rejection.

Parry discloses: "The object of my invention is to prevent the paraffine at the lower ends of oil-well tubes from becoming indurated, and thus choking up these tubes and preventing the free flow of the oil through them." (Parry, page 1, first column) Parry also discloses:

> By this arrangement, I am enabled to keep up a constant circulation of heated water in the box B, which is so constructed that it constitutes the lower extremity of the well-tube, and by keeping up a flow of heated water or steam I constantly supply new increments of heat to the box B, which is submerged in the oil immediately surrounding the entering end of the tube, and by giving off its heat to this oil all choking up of the pipe at its lower end is prevented; and not only is this the case, but the heated box B will keep the oil in a very liquid state, so that it will flow freely through the tube and pumping apparatus. (Parry, page 1, second column)

Parry appears to teach using a heated fluid to keep the oil in a "very liquid state." (Parry, page 1, second column) Claim 4165 describes a combination of features including: "heating a wellbore of the production well to inhibit condensation of the mixture within the wellbore." Parry does not appear to teach or suggest a vapor component. At least the above-quoted feature, in combination with other features of the claim, does not appear to be taught or suggested by a combination of the cited art.

N. The New Claims Are Not Anticipated or Obvious In View of the Cited Art

Applicant submits that new claims 5397-5408 do not read on the cited art. Support for new claims may be found in the Specification at least on page 53 (paragraph beginning on line

8), page 73 (paragraph beginning on line 29), page 62 (paragraph beginning on line 19), page 73 (paragraph beginning on line 10), and page 131 (paragraph beginning on line 30). Claim 5400 describes a combination of features including: "wherein one or more of the heaters provide a heat output of less than about 1650 watts per meter." At least the quoted feature in combination with the other features of the claims does not appear to be taught or suggested by the cited art.

O. Additional Comments

Applicant submits that the claims are in condition for allowance. Favorable reconsideration is respectfully requested.

A Fee Authorization is enclosed for the additional claims fee. If any extension of time is required, Applicant hereby requests the appropriate extension of time. If any further fees are required or have been overpaid please appropriately charge or credit those fees to Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C. Deposit Account Number 50-1505/5659-08200/EBM.

Respectfully submitted,

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